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Proceedings of the RAP Meeting on Atlantic Walrus

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Abstract

The status of Atlantic walrus (*Odobenus rosmarus rosmarus*) stocks in Canada was reviewed during a Regional Advisory Process (RAP) meeting held in Iqaluit, Nunavut, in January 2002. The goal of the meeting was to review scientific information and local and traditional knowledge about Atlantic walrus as it pertained to the status of walrus stocks. Three Working Papers, providing a scientific overview of the status of Atlantic Walrus stocks and recent investigations of stock identity were presented and discussed. The text of this Stock Status Report for Atlantic Walrus was drafted, reviewed, and discussed. The meeting provided opportunity for input of information by resource users, marine mammal scientists, and managers. There was considerable discussion about hunt data, stock delineation, estimates of stock size and evidence for trends in stock size, recognizing that although subdivision of the four main identified stocks was tentative, there is high probability that sub-stocks exist. It was generally agreed that many uncertainties remain concerning the status of Atlantic Walrus and the variables used to designate status: stock delineation is only broadly defined; estimates of walrus numbers are incomplete for most areas; data on landings and losses from hunts are incomplete.

Résumé

L'état des stocks canadiens de morse de l'Atlantique (*Odobenus rosmarus rosmarus*) a été examiné lors d'une réunion du Processus de consultation régionale (PCR) tenue à Iqaluit, au Nunavut, en janvier 2002. Le but de la réunion était de passer en revue les renseignements scientifiques et les connaissances locales et traditionnelles sur le morse de l'Atlantique s'appliquant à l'état des stocks. Trois documents de travail présentant une vue d'ensemble de leur état au plan scientifique et de récentes études de l'identité des stocks ont été présentés et discutés. Le texte du présent rapport sur l'état des stocks du morse de l'Atlantique a été rédigé, examiné et discuté. La réunion a permis aux utilisateurs de la ressource, aux spécialistes des mammifères marins et aux gestionnaires présents de faire part de leurs commentaires. Les données sur les prises, la délimitation des stocks, les estimations de la taille des stocks et les tendances de la taille des stocks ont été longuement discutées, pour en venir à la conclusion que, même si la sous-division des quatre principaux stocks identifiés était provisoire, il est fort probable qu'il existe des sous-stocks. D'un accord presque unanime, les participants ont reconnu qu'il reste beaucoup d'incertitudes quant à l'état des stocks de morse de l'Atlantique, que les variables utilisées pour établir l'état des stocks et les délimiter sont sommairement définies, que les estimations du nombre de morses sont incomplètes pour la plupart des régions et que les données sur les prises et les pertes imputables à la chasse sont incomplètes.

Introduction

A Regional Advisory Process (RAP) meeting was held in Iqaluit, Nunavut, on January 29-30, 2002, to evaluate the status of Atlantic walrus (*Odobenus rosmarus*). The meeting was held in support of a review of the quota system and development of management plans for walrus by the Nunavut Wildlife Management Board (NWMB) and the Department of Fisheries and Oceans (DFO). Scientific information and local and traditional knowledge about Atlantic walrus, was reviewed according to the Terms of Reference for the meeting (Appendix 1). Participants (Appendix 2) included personnel from DFO Science, DFO HFOM (Habitat, Fisheries and Oceans Management), NWMB, Nunavut Tunngavik Incorporated (NTI), and members of the NWMB-DFO Walrus Working Group (WWG). Members of the WWG included resource users from walrus hunting communities.

The RAP chair opened the meeting with a description of RAP and the general goals of the meeting. Participants reviewed and accepted the agenda (Appendix 3) and Terms of References as written.

The structure of these Proceedings is based on the review of the three Working Papers (Appendix 4) and draft Stock Status Report that were tabled for review. The discussion at the meeting that is presented in this report is summarized for each document, and does not follow a strict chronological sequence of the discussion that occurred at the meeting. For each of the Working Papers, a contributing author first presented a short summary, and the subsequent group discussion and recommendations are recorded here. For the draft SSR, the Chair or relevant contributor presented drafted text in logical sections, and the floor was then opened for discussion.

Working Paper #1: Review of Atlantic Walrus (*Odobenus rosmarus rosmarus*) in Canada (Author: R. E. A. Stewart)

Presentation of this paper stimulated some discussion regarding the timing of aerial surveys, particularly in northern Foxe Basin where surveys were done in August. It was suggested that these surveys did not accurately document the numbers of walrus near Hall Beach because the largest numbers of walrus are in that area in mid-late September. Walrus are not present in August in the Hall Beach area, but arrive in large numbers in September, believed to come from Hudson Bay. At this time there may be little ice, but there are four or five islands where the ice remains and during September, this area is filled with walrus.

There were also some comments by a resource user on the changing distribution of walrus in northern Foxe Basin With the reduction in overall ice cover and multiyear ice in Fury & Hecla Strait in the past ~10 years, the walrus are now seen on islands in areas where they have not been before. This demonstrates that walrus distribution is governed by ice in northern Foxe Basin, and this probably holds true for other stocks.

Regarding the movements of walrus, hunters from Igloolik do not believe that walrus from Igloolik migrate down to Coral Harbour (with which researchers concurred). It was suggested by the resource user that this is an issue that requires research.

Among hunters in northern Foxe Basin, it is a commonly held belief that there are two different types (which they call "stocks") of walrus in the area, based on "colour, structure and sizes". Walrus in Steensby Inlet are larger than those near Igloolik. In Hall Beach the walrus are a slightly different colour. It is thought that differences may be due to differences in diet and that studies on stock discrimination should pay attention to the food that walrus eat.

Hunters in Igloolik are also concerned about taking walrus that occur near Dew Line Sites because of the risk of higher contamination in these areas. They urged that studies of contaminants in the food of walrus be done in those areas.

There was some discussion of the use of ugliit (land-based haul-out sites) as indicators of walrus presence or absence. This Working Paper referred to abandoned ugliit as evidence of a reduction in stock size. One participant cautioned that information on haul-out sites (ugliit) described as "abandoned" should be interpreted carefully. It was suggested that use of, and fidelity to, ugliit is dependent on seasonal and environmental conditions. For instance, the ugliit at Loks Land and Savage Islands are not

used during the open water period until the fall, when they appear to be favoured because of the "amount of current and lack of large swells". Other ugliit are used at other times when the weather is better, but when large swells from the North Atlantic come in, they move to the more protected ugliit of the Savage Islands and Loks Land. In addition, ugliit may be used secondarily to ice.

The author agreed that one needs to be careful when documenting abandonment of ugliit, for the reasons brought up, but for the most part, the references to abandonment of ugliit in the Working Paper were for ugliit that were not used continuously for 20 years or more.

In support of using abandoned ugliit as warnings of stock decline, scientific evidence from Greenland and elsewhere shows, that certain ugliit that were at one time used consistently every year, are no longer used. When documented properly, such information is an important indicator of stock trends and can provide a clear signal of stock decline.

A question was raised regarding trichinosis levels in Nunavut, noting that the Nunavik lab provides test results in a few days. The author replied that a small sample (n=40) from Hudson Bay walrus suggested a low incidence of disease during the mid-80's. Subsequent attempts to justify a disease lab in Nunavut have been unsuccessful (no funding, low numbers of samples).

Working Paper #2: Investigation of Atlantic walrus stock structure in Canada and Greenland using dental Pb isotope signatures reflecting underlying geology. (Authors: Outridge, P.M., W.J. Davis, R.E.A. Stewart, and E.W. Born)

After presentation of the paper by one of the authors, clarification was requested regarding how differences between walrus are detected using lead isotopes and whether walrus from Coral Harbour belong to the same group as those from Igloolik. It was also asked: if isotope signatures are influenced by diet, then what is the effect of a seal diet? If walrus that eat seals range widely (e.g. walrus arriving in Thule), would they not integrate lead levels from different areas and result in a noisy isotope signal?

A lay description of the analysis methods was provided, indicating that material is extracted from tooth samples, and analysed for varying levels of four forms of lead. The isotope data for walrus from Coral Harbour and Igloolik indicated that these animals live in different places. The author explained that a seal diet would influence the isotope signature and could confound the analysis of differences, when one sample group containing some walruses that eat seals and picking up lead in other areas are compared to another group that are eating exclusively bivalves. However, the isotope map of lead for the arctic region is very incomplete and although the working paper demonstrates differences between walrus from different geographic areas, the results are not being used to conclude where the animals must be feeding.

It was pointed out that it is important to remember that if there is no genetic difference detected between two groups, this does not necessarily mean that the stocks are not different. In fact it may still be important to treat the groups as separate stocks, until further scientific investigations are done, such as isotope or contaminant studies.

Clarification on the type of information resulting from the isotope technique was requested, specifically whether sample size was sufficient to determine what area the walrus comes from or, for instance, if one could observe gradation across a range. The author indicated that the sample size was insufficient from some communities to conclude anything about an area signature; collection methods also did not allow for an analysis of walrus lead isotopes across a geologic gradation, since samples were collected by community without any location attached.

It was asked what years were represented by the samples collected; samples collected only over a short term may not be representative of reality, particularly if sample collection was clumped. The author indicated that the largest sample sizes were collected over a period of 3-4 years in the mid 1980s and the Akulivik samples were collected over a short term; none over the course of a decade but all except the smallest samples were collected from more than one year. It was noted that in the summary table illustrating significant differences, findings that were not significantly different does not necessarily mean that the groups are not different, just that the differences may not have been detectable.

Working Paper #3: Genetic relationships among Atlantic walrus (*Odobenus rosmarus rosmarus*) in the Canadian Eastern Arctic. (Authors: Brigitte G.E. de March, Lianne D. Maiers, and Robert E.A. Stewart)

The author provided a lay description of the use of genetics for stock identification and comparison of individuals, indicating that genetic results do not distinguish Hall Beach and Igloolik samples completely.

Caution was urged when interpreting genetics data in relation to stock identity. One should not assume that walrus from different aggregation areas are from the same stock, simply because there is no difference observed genetically. The combination of using different stock ID techniques in addition to genetics, such as isotope analysis, is thus useful for stock differentiation.

Draft Stock Status Report

Background

It was indicated that walrus hunting is subject to the terms of the Nunavut Land Claims Agreement and this fact should be included in the description of the legislation governing walrus hunting.

A possible need for further subdivision of the four presumed stocks was noted, based on a further reading of stock identity, walrus distribution and aggregation areas.

Species Biology

Clarification regarding the diet of walrus was suggested. In addition to the common diet of bivalve molluscs for walrus found in shallow water areas, it is commonly known that some walrus, typically seen in deepwater areas, have a diet that includes seals. Walrus that eat seals typically have yellowish tusks. Seal eating was suggested to occur late in winter and early spring in deepwater areas, when they don't have access to shallower areas for feeding on bivalves (e.g. walrus in Lancaster Sound).

Site fidelity to haul-outs and feeding areas was considered to be an important component influencing distribution of walrus (particularly females), as evidenced by genetics and individual resightings, and this point should be included in this section.

The Hunt

A presentation was given on a review of DFO hunt statistics, dating back to 1977, noting that there was much uncertainty in the data due to variability in data sources, reporting procedures and consistency. The 1977-1987 hunt records represent data collected from DFO, GNWT, RCMP and Hudson Bay Company records of marine mammal harvests.

The 1988-1996 hunt records are taken from DFO annual harvest summaries for Arctic communities. In these years, walrus hunts were either: monitored by Fishery Officers or Renewable Resource Officers, or reported by Government Liaison Officers. In some cases, where data were missing, harvests were estimated using long-term averages, or in some years, estimated using sales slips and trade records. Fishery or Renewable Resource Officers sometimes estimated potential reporting errors as +/- some amount to represent the uncertainty in the precise number harvested.

The 1997-2001 hunt records are those reported by community Hunters and Trappers Organizations (HTOs), and are not corrected for hunting losses.

It was noted that hunting losses were not included in the statistics and there was little information on the composition of the landed catch (ages or sex).

Comments from several individuals from walrus hunting communities indicated concern about hunt data reported for the communities. It was explained that DFO collects data on walrus hunts by telephone calls to each of the HTOs or Department of Sustainable Development (DSD) officers, and accuracy of the data relies on hunters reporting their harvests to the HTO. Specific reports from participants from walrus-hunting communities indicated that not all walrus hunters report their harvests and those that do may not

do so consistently. It was generally agreed that a more accurate record of the actual hunt and a better reporting system was required to accurately reflect the harvest levels for each community, especially in light of the completion of data collection for the Nunavut Wildlife Harvest Study (NWHS).

There was discussion regarding the current regulations governing the hunting of walrus in Nunavut. Although sport hunting is not permitted under the present Marine Mammal Regulations, the Land Claims Agreement allows for aboriginals to assign their hunting right to others. An incident was described concerning a native (Indian) who had moved to one of the walrus-hunting communities. There was confusion in the community regarding his right to hunt.

It was indicated that a fisheries working group, formed by DFO, is reviewing the federal government fisheries regulations. One of their intentions is to compile the Marine Mammal Regulations into one piece of legislation under the Nunavut Fishery Regulations. The draft of these new regulations will be forwarded to the communities for review in the near future. Recommendations from the WWG, such as on issues of hunting rights are welcome.

The topic of loss rates for subsistence and sport hunting was discussed. All participants from the communities felt that actual loss rates were low and that studies suggesting loss rates of 30% or more did not reflect accurately the true loss rates. It was indicated that walrus hunters typically harpoon an animal before it is killed to ensure that the animal is not lost. Moreover, the hunt takes place in shallow water and even if the animal sinks, it usually can be retrieved. It was noted that loss rates likely vary seasonally and loss rates from specific studies, should only be applied according to the proportion taken during the season that it represents.

It was indicated that reporting of loss rates during sport hunts was required as a condition of the licence; although the data from the community is not compiled yet, all approved sport hunts out of Igloolik resulted in a walrus being taken and no walrus were lost; hunts were usually successful within three days of hunting or less.

A review of information on walrus hunts from the Nunavut Wildlife Harvest Study (NWHS) was provided, based on preliminary data collected during the first three years (the NWHS was a five-year study that ended in May 2001). Overall harvests were determined from reporting hunters plus estimates of hunt landings by other hunters who were not available for the reports. Data were presented using a June to May cycle, according to when the NWHS began. The high annual variability in walrus hunts was pointed out. This may reflect annual differences in environmental conditions and accessibility to walrus. It was noted that in the second year of the NWHS, when harvests were lowest for all communities in the high Arctic region except Arctic Bay, harvests for Arctic Bay were the highest. The reasons for this type of pattern were not clear and the study was not designed to address these questions, but provides some interesting information to reflect on possible dynamics of walrus distribution and movements.

Discrepancies between hunt statistics reported by DFO and those of NWMB may be due to weaknesses within the reporting systems. Hunters interviewed by the NWMB data collector may not have reported their catch to the HTO, to avoid double reporting. Errors in the NWMB data collection may stem from the fact that not all registered hunters are interviewed each month and estimates for missing data are derived from the results by other hunters weighted for the hunting intensity of the individual. Concerns regarding the end of the NWMB harvest study were voiced, suggesting that some mechanism to more accurately record the walrus hunt was required.

Participants from some walrus hunting communities indicated that they were uncomfortable with the use of estimates for harvest levels. Weaknesses in this approach were described: the reporting requirement is voluntary, therefore some full time hunters don't bother to report the results of their hunting efforts; some hunters forget to report their catch, or, are reluctant to report their catch if the animal is small. It was suggested that there be a push to develop a reporting structure that included results for all hunters. There was also some criticism that the current DFO process of collecting hunt statistics through verbal reports during telephone calls to HTOs and Renewable Wildlife Organizations (RWOs) was not rigorous enough to capture the true levels of the hunt.

There was also some confusion expressed by resource users about the use of averages to express hunt levels rather than actual values. The purpose of averages was explained, noting that these figures are used to provide a simple overview of walrus harvesting for a community.

It was unclear whether the indication of long term reductions in harvest levels in nearly each community for which there was data indicated a reduction in hunting pressure or reduction in availability of walrus in all communities. In Sanikiluaq, it was noted that walrus are not present in the large numbers that were present about 50 years ago and hunting now takes place further afield than it used to. However, participants from most walrus hunting communities contended that the numbers of walrus have increased in recent years. They indicate that reduced harvest levels are more likely due to a reduction in the number of dog teams, causing a reduction in the demand for walrus meat and thus a reduction in the hunting pressure.

Concern was raised that the reduction in harvest levels not be explained away too quickly. It was pointed out that no analysis has been presented on this issue. For instance, a severe decline in the harvest levels in the Baffin region is apparent. In the 1970s there was a harvest in the magnitude of 150/yr, whereas in the 1980s and 1990s it never exceeded 50/yr. It was suggested that this is a warning signal that should be looked at more closely, before concluding that this is simply due to changes in hunting pressure. As an example, a stock decline of walrus in west Greenland has led to a decline in harvest levels in that area. A simple but thorough trends analysis of catch statistics was suggested. Attempts to resolve discrepancies in catch statistics between DFO and NWHS was suggested, to correct for under-reporting and to account for possible deterioration in the reporting of catch statistics. If the catch statistics are considered incomplete in recent years, it might be advisable to use harvest data from the harvest study to compare to DFO catch statistics from earlier years, when the data are thought to be more complete.

It was noted that changes in socio-economic conditions such as the reduction in use of dog teams, and known factors that have influenced hunting pressure should be taken into account in any trends analysis of harvest levels. For instance, the number of big boats used for hunting walrus in some communities has changed. Two examples of this were described. The first example was a large boat in Iqaluit that harvested about 15 walrus annually for the community. This boat was lost in an accident at sea during an annual walrus hunt one year, representing a loss of both equipment and expertise; this loss may have reduced the hunting pressure on walrus in this area. The second example described the economic factors that now make it more advantageous for these large boats to haul soapstone and other goods than to hunt for walrus. Now smaller boats are used in hunts and they return with fewer walrus.

It was noted that the hunt taking place at each community provides an excellent opportunity to obtain walrus samples that would be very useful for assessment of stocks. The difficulty of obtaining samples in the past was described, in spite of efforts and use of financial incentives to do so. However the collection of samples is not a requirement of the subsistence or sport hunts.

Resource User Perspective

Hunters from Coral Harbour, Rankin Inlet, Cape Dorset, and Hall Beach indicated that the numbers of walrus have been increasing in recent years. In Coral Harbour, numbers are increasing in the vicinity of the community. In the past, hunters had to travel about 80 miles south to Coats Island, but last year hunters only had to travel about 5 miles to hunt walrus. Two years ago, one participant observed many walrus near Nottingham Island, only 30 miles from Coral Harbour. Observers from Rankin Inlet and Whale Cove said that there appear to be more walrus travelling in that area.

Observed reductions in the presence of walrus near some communities (Igloolik and Hall Beach), is thought to be due to changes in distribution of walrus and not a reduction in numbers.

It was explained that in northern Foxe Basin, the ice conditions have changed in the past 5-10 years, resulting in a reduction of multiyear ice that walrus use for hauling out on. Hunters now rarely hunt in areas where their elders hunted. In fact, although ice is preferred for hauling out, walrus are now hauling out on land more than they used to. This change in the presence and distribution of ice also appears to have influenced the movements of polar bears. Increasing numbers of polar bears have been observed and it is thought that they are moving in from Hudson Bay, where numbers are falling. Polar bears have been observed on some islands where walrus have been hauled out and have been observed raiding hunter caches of walrus meat. In general, hunters believe that changing environmental conditions dictate the numbers of walrus and other animals in specific areas.

A resource user reiterated that in Sanikiluaq the numbers of walrus are reduced in comparison to his youth (circa 1950's). In his youth, walrus were hunted from large boats in the Salisbury and Nottingham Islands area.

Several participants from walrus hunting communities reported that since the reduction in numbers of dog teams, there has been a significant decline in the demand for walrus meat to feed dogs. For instance, in Coral Harbour, hunters rarely take even half the allotted quota. However, hunting methods and hunting effort for human consumption is thought not to have changed dramatically in recent years. The advice of elders and more experienced hunters is still respected and sought out by younger hunters. In some communities, youth are being initiated to the hunt and trained in hunting techniques through local programs.

There is a concern in Igloolik and Hall Beach about disease and contaminants in walrus. Recently there has been an increase in trichinosis in Igloolik and people from the communities are concerned about eating walrus. Contaminants are of particular concern in areas of former Dew Line Sites. Hunters tend to avoid hunting walrus near these sites.

There are also some concerns regarding the impacts of tourism, particularly since these activities are unregulated and take place without consultation of the communities or Hunters and Trappers committees. Hunters in Northern Hudson Bay have observed that cruise ships and other tourist activities can disturb walrus and make them unavailable or more difficult to hunt.

There was one statement by a resource user indicating that in some areas, the numbers of walrus may be rising while the numbers of seals may be decreasing. It was suggested that this trend may not be desirable, and it was asked at what point walrus might be considered a pest.

During a break in the meeting, the participants from walrus hunting communities and from NTI summarized key observations of walrus for inclusion in this section. The participant from Arctic Bay did not wish to make any comments on walrus distribution.

Resource Status

Stock Delineation

The separation of Atlantic walrus into only four broad stocks (south and east Hudson Bay, or SEHB; Hudson Bay-Davis Strait, or HBDS; Foxe Basin, or FB; Baffin Bay, or BB) was questioned. Although there may be little or no evidence to distinguish stocks more finely, it is well known that walrus generally aggregate in certain regions, returning to use the same areas every year. Based on the distance between some of these aggregations within the broader stock categories defined above (e.g. aggregations in the HBDS stock), general knowledge of walrus behaviour and movements suggests that they do not interbreed and are essentially different stocks. A better description of "stock" for management purposes might be "the aggregation that supplies the hunt". The reason for specifically identifying these aggregations that supply the hunt as separate management units is to reduce the risk of overexploitation of one of these aggregations. It was reasoned that due to the lack of knowledge of specific stock structure, it is more conservative to assume a complicated stock structure rather than assume they belong to the same stock. Managing only on the basis of the broader stocks makes it more likely to repeat past failures (Svalbard, Nova Scotia, west Greenland) of extirpating of local stocks. It was suggested that an explanation would be useful to clarify the context for stock delineation and management. This could include a description of walrus fidelity to specific areas, indicating that the range of their dispersal is restricted, and that they need to be managed on the basis of small stock units. It was generally agreed that revision was required to clarify and refine the definition of working management stocks. There was further discussion about the movements of walrus within the currently designated stocks in Canada. Clarification was requested regarding the stock structure within Hudson Bay-Hudson Strait region. Local understanding of walrus within Hudson Bay is that there is a concentration around the Nottingham & Salisbury Islands and Coats Island areas during summer and fall but that there also is considerable movement by some walrus. It was suggested that this movement needs to be documented much better, since there is little known about the extent of movements. It was agreed that the stock

definitions did not preclude movements in the region but are unlikely to include further ranging movements such as to west Greenland.

It was suggested that the Hudson Bay-Davis Strait unit be subdivided into sub-stocks (management units) based on the distance between localities and the probability that individuals from these different units do not interbreed. For instance, Nottingham Island, Salisbury Islands, and Coats Island would be one sub-stock. This sub-stock does not supply, and is distinguished from, the west Greenland sub-stock. South-east or north-east Baffin might be connected to west Greenland, but these should still be treated as separate sub-stocks. East Hudson Bay walrus appear to be separate from the Coats Island sub-stock.

A resource user indicated that walrus move from the west to the east sides of Hudson Bay, that walrus seen near Coral are also seen near Rankin Inlet.

It was noted that males are less sedentary than females and that this might indicate possible range overlap of males between different sub-stocks but not of females.

A description of potential sub-stocks and the basis (scientific data and distance between localities) for identification was provided. Seven possible sub-stocks were identified: S&E Hudson Bay (from Inukjuaq and south); northern Hudson Bay (west end of Hudson St. to NW corner of Hudson Bay); Hudson Strait (includes Akulivk; largely migratory but some stay); SE Baffin and east Baffin (connection to west Greenland unknown); Foxe Basin (may be two stocks, but no clear methods to distinguish range); Lancaster Sound (extending to western Parry Channel); Jones Sound/Smith Sound, and north Baffin (from central high Arctic across to north Greenland). Uncertainties were identified regarding whether walrus near Sanikiluaq and James Bay (S&E Hudson Bay) were one or two stocks, but probably could be considered one stock without much risk since there is no hunting of walrus in James Bay.

There was some discussion about whether to break the S&E Hudson Bay sub-stock into two stocks. Some felt that the distinction was not clear enough to warrant two stocks and that the two proposed groups might simply be explained by movement of walrus from one area to another. Others felt that using two groups would simply follow the approach of reducing risk.

Although there was general agreement with the sub-division of stocks for management purposes, it was suggested that the Hudson Strait designation be confirmed with communities from Hudson Strait. For the northern Hudson Bay sub-stock, it was suggested that it be noted that walrus are widely distributed in this region. Although Coats Island is the main centre of distribution, walrus likely travel widely within this region. For instance, it is likely that hunters from northern Quebec (Akulivik, Povungnituk), Coral Harbour, Rankin Inlet, Cape Dorset, and Lake Harbour share the same walrus.

A resource user indicated that there are two types of walrus seen in the northern Baffin Island area: 1) those that eat seals, are transitory and seen in deeper waters, and 2) those that do not eat seals, are sedentary and are seen in shallower waters.

Stock Size

Noting the sub-stocks that were identified in the previous section, it was suggested that the data for stock size needed to be presented for these sub-units. Gaps in the information presented were identified, including data for west Greenland. It was noted that the existing text for Hudson-Bay-Davis Strait actually only reports on data for the Hudson Bay region and so the other areas need to be included (Ungava Bay, central and eastern Hudson Strait, south-east and eastern Baffin Island).

There was some discussion about the numbers in Foxe Basin and about the isotope evidence for different stocks from samples from Hall Beach and Igloolik. Although hunters from Hall Beach and Igloolik recognize two types of walrus, they effectively treat walrus in northern Foxe Basin as one population, since hunters from each community hunt in the area of the other community. However, although we don't know how to divide the abundance estimate, we need to recognize that the isotope studies indicate that there are at least two groups of walrus in Foxe Basin. It was also identified that there were references to survey data that need to be included for Foxe Basin. For example, Richard et al. (in prep) and Cosens et al. (1993), provide an estimate of 5500 for Foxe Basin and Stewart (2002) indicates that this estimate should be considered at the low end because it does not account for diving animals. An explanation was provided that surveys reported by Richard et al. were not included because the data

were in preparation, had not been peer reviewed, and had a large confidence interval. It was pointed out that the reference is used elsewhere in the document and there was some criticism of the fact that this survey was 13 years old and is still in preparation, and that survey data that are in preparation provide no value for assessing trends in population.

A summary of surveys of walrus haul-out sites that have been flown in the past four years along the coasts of Devon Island, Cornwallis Island, Bathurst Island and Ellsemere Island was provided, indicating that the overall estimate of the minimum known alive for this area is about 350 walrus. Since about 10% of these are calves, one can begin to determine what a minimum sustainable yield would be. It was suggested that this was not sufficient for the Baffin Bay population since it does not cover the whole range (e.g. Prince Regent Inlet, northern Baffin Island, Smith Sound, and Kane Basin).

Other points of discussion included comments on the quality of estimates of walrus numbers, citing dates of references as old and identifying gaps in information for various regions and seasons. Some participants complained that none of the estimates provided were real numbers and expressed discomfort with the use of estimates. One participant indicated that although the numbers may be out of date, they served as a starting point for future planning of domestic and sport hunts.

Most participants recognized the value of better and more frequent counts of walrus, as indicators of stock status and trends. Some participants recommended that more effort to assess stock size is required.

Stock Trends

New text for this section was presented, based on the identification of sub-stocks in previous sections. He indicated that indirect methods are used in this section to assess stock trends (changes in distribution, harvest levels, body condition). For SE Hudson Bay, some data on walrus in the mouth of James Bay are held by Ontario Ministry of Natural Resources and are not yet published, but should be included in future assessments.

There was discussion regarding the evidence for decline based on abandoned haul-out sites. Some suggested that this evidence is old, that not all sites are abandoned, that some sites are now used again (e.g. west side Foxe Basin), and hunters in several communities have observed that walrus numbers have risen in recent years. Another participant indicated that despite the age of the evidence, the reports of abandoned haul-out sites remain relevant, since the recovery of walrus is potentially very slow. For example, the experience from Svalbard, east Greenland and west Greenland, where walrus were hunted intensively for a number of years and walrus have abandoned haul-out sites, is that they still have not returned to these haul-out sites after 50-100 years (in Svalbard they are still absent from haul-out sites 300 years after protection). Ben suggested that there may be two reasons for haul-outs being abandoned: 1) complete extirpation of the stock, which would explain the lack of recovery after 300 years, and 2) movement of walrus to another area because of misuse of haul-outs (e.g. butchering of hunted walrus right on the haul-out). He suggested that the explanation for abandoned haul-outs in Nunavut is more likely due to changes in ice distribution or misuse of haul-out sites and that walrus have moved and are likely to come back if conditions change.

It was indicated that regardless of the true reason for the absence of walrus in an area where they were once numerous, it is generally safest for the future of walrus to conclude that numbers have been reduced until it can be demonstrated that they have gone somewhere else. The risk in simply assuming that they have gone somewhere else is that there is only a certain amount of habitat that they can live in, since walrus cannot live everywhere. If they move into other areas, they may become overcrowded and their numbers will likely decrease anyway.

Sustainable Harvest

An overview of how sustainable harvest is normally determined for a rapidly growing marine mammal population was provided, suggesting that 2-5% of population size be used as a target harvest rate. The table below was presented, which summarized the known variables for each proposed management unit and compared the calculated sustainable harvest to the current estimated harvest.

Stock	Esimated Size	Year of estimate	Total allowable removal 2-5%	Reported harvest (DFO)	Comment
South & East Hudson Bay	?		?	10	Que harvest uncertain
Hudson Bay - Davis Strait					
1) Northern Hudson Bay including Foxe Peninsula	?		?	45-50	Kivalliq & Quebec Que harvest data very poor
2) Hudson Strait	?		?	~10	Quebec data missing
3) SE Baffin Bay include West Greenland	?		?	~27	
Overall Hudson Bay - Davis Strait	204-1512		5-75	~85	
Foxe Basin	2700-11200	1989	54-560	~180	
Baffin Bay					
1) Lancaster Sd	?		?	2-3	
2) Jones Sd - Smith Sd	>360	1998-2001	7-18	6 220	Canada Avemasuaq(1993) 220

The estimates of population size used in this table include confidence intervals. Using a population size of 5500 for Foxe Basin produces a sustainable harvest of 110-275 walrus/yr. For the portion of the NHB walrus population occurring in the Coats Island area, a sustainable harvest would be 30-70 walrus/yr. The sustainable harvest for the west end of Jones Sound is 8-14 walrus/yr.

It was noted that population sizes are not well known and that tabled values are mostly under-estimates.

Sources of Uncertainty

The Chair provided a review of the uncertainties as already documented in the draft SSR. The list of uncertainties identified, including those from the discussion that followed the Chair's remarks were:

- the uncertainty regarding stock sizes and trends should include the reports of resource users in some communities that suggest that walrus numbers appear to be increasing
- the uncertainties regarding the harvest estimates should be included, i.e. uncertainties in the figures arising from different reporting agencies over time (especially before 1988), imprecise values (e.g. long term averages, large potential reporting errors), no estimates of hunting losses for walrus harvests other than Foxe Basin
- the uncertainties about which walrus stocks are hunted by Northern Quebec (Nunavik) communities (e.g. Hudson Bay Davis Strait stock, South East Hudson Bay stock)
- the lack of recent population estimates for all walrus stocks, with which to evaluate the impact of hunting activity

- stock identity in S&E Hudson Bay
- the impact on stock definition of transient seal-eating walrus (that are thought to move large distances)
- uncertainty regarding the impact of environmental variables such as climate change, ice, walrus food sources and other species that walrus interact with;

Outlook

This section was incomplete and new text to describe the outlook for the various sub-stocks identified was proposed. It was recognized that this section should include a statement about the Foxe Basin stock that recognizes that there is some information to allow some speculation of the outlook for this stock.

Other Considerations

Resource users confirmed their concern regarding contaminants in walrus, particularly around former locations of DEW Line Sites. Their concerns included the impacts on human health as a result of ingesting walrus meat, which might influence hunting practices.

There was a question raised regarding the analysis of walrus meat for disease. It was noted that Nunavik hunters can send samples to a nearby lab (in Kuujjuaq) that provides results within days, and indicates whether the animal is fit to eat. Hunters asked how the levels of trichinosis in walrus in Nunavut compare to those in walrus in Nunavik or other areas, and is similar testing warranted? It was indicated that some small studies have been done (a small sample from Hall Beach indicated a low incidence of *Trichinella* in the mid-1980s) but larger comparative surveys have not been done because of difficulty of obtaining funding and samples.

The impact of tourism was raised, noting that walrus tend to move further into the ice after first visits by tourists, making it difficult for hunters to have access to walrus after tourists have visited walrus sites.

Regarding fisheries interactions, the only current fishery identified that involves dragging is turbot fishing. Since it is conducted offshore in waters more than 1000 metres deep, the impact to walrus may not be significant. The only other fishery that could likely impact walrus is scallop dragging. Experimental scallop dragging in Cumberland Sound and near Sanikilluaq has been done in the past but is not presently taking place.

Management Considerations

A review of the text in the draft SSR was provided. There was little support among resource users for statements suggesting that an influx of younger hunters might influence the hunt by increasing pressure on the stocks and increase loss rates. It was felt that the demand for walrus meat for human consumption was actually dropping in spite of an increasing human population. Resource users also indicated that young hunters still rely in the experience of older more experienced hunters and seek out advice of elders before hunting on their own.

The Chair proposed that this section be replaced by text that would state the general need for caution in management. This text would identify the general deficiency of data for evaluation of stock status, including the many uncertainties in the data that exist, and suggest that caution is warranted in making management decisions.

One resource user indicated that walrus management was considered a local affair and that direction was not needed. The Chair explained that the intention of this meeting was not to provide management direction but to provide the best advice possible on the impacts of management options, using the information and expertise gathered at this meeting.

An alternative proposal was that "younger hunters" be replaced with "inexperienced hunters".

The meeting was adjourned prior to achieving consensus on this issue, with a suggestion that some text might be derived during discussion of management issues at the WWG meeting.[1]

References

Cosens, S. E., R. Crawford, B. G. E. de March, and T. A. Shortt. 1993. Report of the Arctic Fisheries Scientific Advisory Committee for 1991/92 and 1992/93. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2224: 1-51.

Reeves, R. R. 1978. Atlantic walrus (*Odobenus rosmarus rosmarus*): a literature survey and status report. U.S. Department of the Interior, Fish and Wildlife Service, Wildlife Research Report 10: 41 p.

Richard, P. R. 1995. Catch of walrus in the eastern Canadian Arctic: 1984-1993. In litt.

Richard, P. R., D. G. Barber, and J. R. Orr. Summer distribution and numbers of walrus in northern Hudson Bay, western Hudson Strait, and Foxe Basin. In prep.

Richard, P. R. and R. R. Campbell. 1988. Status of the Atlantic walrus, *Odobenus rosmarus rosmarus*, in Canada. Canadian Field Naturalist 102: 337-350.

Stewart, R. E. A. 2002 Review of Atlantic walrus (*Odobenus rosmarus rosmarus*) in Canada. Canadian Science Advisory Secretariat Research Document 2002/092.

[1] NOTE: Relevant statements from discussions during the meeting and text from other portions of the draft SSR were used to complete this section of the SSR.

Appendix 1. Terms of Reference

Regional Advisory Process Meeting - Atlantic Walrus
29-30 January
Navigator Inn
Iqaluit, Nunavut

Background

Atlantic walrus (*Odobenus rosmarus*) have been divided into two populations, basically one east of Greenland and one in western Greenland and Canada. They occur throughout the eastern Canadian Arctic, previously as far south as Nova Scotia.

Arctic walrus stocks have been used for subsistence by aboriginals for generations, providing food for humans and dogs and materials for clothing and carving. In Canada, the main period of commercial harvesting started in the late 1800's and continued well into the 1900s (Reeves 1978). Commercial hunting of walrus was banned in 1928 by the Walrus Protection Regulations (Richard & Campbell 1988).

Walrus are not in any COSEWIC category. Walrus hunting is currently legislated under the Marine Mammal Regulations made under the Fisheries Act. Currently an Indian or Inuk can take, without licence, 4 walrus per year unless there is a community quota (Section 26). Non-aboriginals may take walrus only when licensed under Marine Mammals Regulations or Aboriginal Communal Fishing Licence Regulations. Sport hunts for walrus are becoming increasingly popular. Export of walrus parts from Nunavut and among provinces is permitted under DFO permit. International trade is permitted under CITES Appendix III. The Nunavut Wildlife Management Board is currently reviewing the quota system and considering new ways of managing the walrus hunt.

Proposed Terms of Reference

In support of a review of the quota system and development of management plans for walrus by the Nunavut Wildlife Management Board and the Department of Fisheries and Oceans, the goal of this meeting is to conduct a review of information for Atlantic walrus, according to the following items, and produce a Stock Status Report with associated supporting documents.

- ***Background:*** *provide a general overview, describing the context for the review; what stocks are we talking about? how have they been used as a resource historically and at present? how are they currently protected and managed?*

- ***Species Biology:*** *provide a general species description and a brief overview of known life history traits and vital rates (can include distribution, movements, reproduction, sources of mortality, habitat requirements, or other characteristics useful or relevant to evaluation of stock status);*

- ***The Hunt:*** *review information on the hunt, including a review of the estimates of the landed catch; review the harvest rates over time for evidence of trends in harvest rates; review information on loss rates and evaluation of correction factors used to estimate total removal;*

- ***Resource User Perspective:*** *describe the perspective of resource users regarding the status of the stock; describe the cultural and traditional importance of the resource to the Inuit, citing references if possible;*

- ***Resource Status:*** *review information related to an evaluation of stock delineation, stock size, stock trend, and sustainable hunting rate; key topics for walrus are:*
  - *stock delineation: review changes in stock range and stock structure; review any evidence for movement between stocks;*
  - *stock size and trend: thoroughly describe the certainties and uncertainties with regard to stock size and ability to detect stock trend; can greater certainty be achieved? review the qualitative information available on stock trends*
  - *sustainable hunting rate: review methods for calculating allowable removals; what hunting rate is considered safe? clearly distinguish between estimates of removal and landed catch*

- ***Sources of Uncertainty:*** *identify the uncertainties in stock identity, abundance estimates, range size changes, vital rates, harvest statistics, replacement yield and sustainable hunting rate, that may contribute to uncertainty in measures of resource use or resource status;*

- ***Outlook:*** *generate a statement on the outlook for the stock, based on a review of it's current status, trend, and any foreseeable events;*

- ***Management Considerations:*** *review the factors that may affect the management of the hunt, including a review of current harvesting and management practices, as well as implications of proposed plans; what are the possible effects of sport hunting*

- ***Other Considerations:*** *review other factors that may affect the future health and status of the resource, such as industry, contaminants, predators, tourism, ice-entrapment, and disease, (including possible impacts on wintering grounds or migration routes, which may include international waters)*

- ***Recommendations:*** *provide advice on the future direction for research, to improve the evaluation of stock status for future assessments*

Appendix 2. Participants List

Name	Affiliation	Location
Joe Arragutainaq[1]	WWG, Sanikiluaq HTO	Sanikiluaq
Jackie Nakoolak	WWG	Rankin Inlet
Jonah Anguilianauk	WWG, Hall Beach HTO	Hall Beach
Ejetsiak Peter	WWG, Aiviq HTO	Cape Dorset
Koonoo Oyukuluk	WWG, Ikajutit HTO	Arctic Bay
Theo Ikummaq	WWG, Igloolik HTO	Igloolik
Johnny Peters[2]	WWG, Makivik Corporation	Kuujjuaq
Joannie Ikkidluak[1]	Qikiqtaaluk Wildlife Board	Iqaluit
Rob Stewart	WWG, DFO	Winnipeg
Karen Ditz	WWG, DFO	Iqaluit
Ipeelee Itorcheak	WWG, DFO	Iqaluit
Michelle Wheatley	WWG, NWMB	Iqaluit
Mads Peter Heide-Jorgensen	Greenland Institute of Natural Resources	Seattle
Brigitte de March	DFO	Winnipeg
Patt Hall	DFO	Winnipeg
Bert Dean[2]	NTI, Director of Wildlife	Rankin Inlet
Glen Williams	NTI, Wildlife Advisor	Iqaluit

1 attended Wednesday only
2 did not attend

Appendix 3. Atlantic Walrus RAP meeting – Proposed Agenda.

Tuesday, 29 January 2002

9:00 Welcome and opening remarks by Larry Dueck

9:20 Introductions, comments by participants, and review of agenda

9:30 Review of background and context for review (refer to Terms of Reference)

9:40 General overview of Atlantic walrus in Canada (Working Paper #1: Rob Stewart)

10:10 Break ----------

10:30 Begin review of draft Stock Status Report
- *Background (review of legislation and management – DFO, NWMB)*
- *Species Biology*

10:45 Review of harvest information (Patt Hall; Michelle Wheatley)

11:00 Continue review of draft Stock Status Report
- *The Hunt*
- *Resource User Perspective*

12:00 Break for lunch ----------

1:15 Continue review of draft Stock Status Report
- *Resource User Perspective*

1:45 Review of recent stock identity information
- Working Paper #2: Rob Stewart – stock identity using chemical characteristics in teeth
- Working Paper #3: Brigitte de March - stock identity using genetics

2:15 Continue review of draft Stock Status Report
- *Resource Status: Stock Delineation*

3:00 Break ----------

3:30 Continue review of draft Stock Status Report
- *Resource Status: Stock Size*
- *Resource Status: Stock Trends*

5:00 Adjourn until tomorrow

Wednesday, 30 January 2002

9:00 Update of process and review of agenda; updates and comments by participants

9:15 Continue review of draft Stock Status Report
- *Resource Status: Sustainable Hunting Rate*

10:00 Break ----------

10:30 Continue review of draft Stock Status Report
- *Sources of Uncertainty*
- *Outlook*
- *Management Considerations*

12:00 Break for lunch ----------

1:30 Continue review of draft Stock Status Report
- *Other Considerations*

2:00 Wrapping up loose ends
- *Review of uncompleted business and assignment of revisions*
- *Comments on contents of Proceedings*
- *Summary of editorial and approval process for Stock Status Report, Proceedings and Working Papers*

3:00 Break ----------

3:30 Wrapping up loose ends, continued

4:00 Closing of meeting
- *concluding remarks*
- *adjourn*

Appendix 4. List of Working Papers for the RAP meeting on Atlantic Walrus.

Working Paper #1
Title: Review of Atlantic Walrus (*Odobenus rosmarus rosmarus*) in Canada
Author(s): R. E. A. Stewart

Working Paper #2
Title: Investigation of Atlantic walrus stock structure in Canada and Greenland using dental Pb isotope signatures reflecting underlying geology
Author(s): Outridge, P.M., W.J. Davis, R.E.A. Stewart, and E.W. Born

Working Paper #3
Title: Genetic relationships among Atlantic walrus (*Odobenus rosmarus rosmarus*) in the Canadian Eastern Arctic
Author(s): Brigitte G.E. de March, Lianne D. Maiers, and Robert E.A. Stewart